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**PATENT APPLICATION FOR:**

**EXERCISE APPARATUS**

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ALC-001

## EXERCISE APPARATUS

### CROSS REFERENCE TO RELATED DOCUMENTS

5 This application is related to U.S. provisional patent application serial number 60/446,927, filed Feb. 12, 2003, to Albert Connelly entitled "Weightlifting Apparatus", which is hereby incorporated by reference.

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### FIELD OF THE INVENTION

15 The present invention relates generally to the field of exercise equipment, and more particularly, in certain embodiments consistent with the invention, to free weight devices to facilitate certain types of exercise and to a hand, arm and finger exercise device for use with and without free weights.

### BACKGROUND

In order to accomplish an increase in the strength and/or mass of a muscle, the muscle is generally overloaded. One of the most common ways to

achieve muscle overload is through repetitive lifting of weights, sometimes referred to as resistance training.

5 In the martial arts there is a series of blocking maneuvers that rely on external rotation of the forearm. The blocks are sometimes converted into grabs of an opponent's arm or directly into strikes at the opponent. Finger strength is important for certain advanced techniques that entail striking the opponent with tips of the fingers and then grasping their flesh to induce pain. In Okinawa, Japan, the geographic origin of karate, exercises to develop arm strength for these maneuvers were traditionally done with stone weights at the end of short  
10 wooden shaft. As karate students became stronger they got bigger stones to work with. Karate students developed finger and hand strength by grasping with their finger tips the lips of clay jars filled with sand. The jars would then be picked up and carried about. The amount of sand was increased as the students became stronger. In the United States the traditional methods are sometimes  
15 used today with cement blocks at the end of a shaft and various traditional and contemporary exercises are utilized for developing finger strength.

#### BRIEF DESCRIPTION OF THE DRAWINGS

An exemplary embodiment of the invention is depicted in the drawings that follow. Many variations and modifications will occur to those skilled in the art  
20 upon consideration of the teachings herein with reference to the above text taken in conjunction with the following drawings that depict an exemplary weightlifting device consistent with certain embodiments of the invention.

**FIGURE 1** is front view of a weightlifting apparatus consistent with certain embodiments of the invention.

25 **FIGURE 2** is a front view of another embodiment of a weightlifting apparatus consistent with the present invention.

**FIGURE 3** is a front view of yet another embodiment of a weightlifting apparatus consistent with the present invention.

**FIGURE 4** is a front view of still another embodiment of a weightlifting apparatus consistent with the present invention.

5        **FIGURE 5** illustrates a weight securing clamp mechanism suitable for used with certain embodiments of the invention.

**FIGURE 6** is a top view illustrating an elliptical shaped gripping plate consistent with certain embodiments of the invention.

10        **FIGURE 7** is a top view of a multiple diameter gripping plate embodiment consistent with certain embodiments of the invention.

**FIGURE 8** is a side view of a two part handle assembly consistent with certain embodiments of the present invention.

**FIGURE 9** is a side view of a handle sleeve consistent with certain embodiments of the present invention.

15        **FIGURE 10**, which is made up of **FIGURE 10A** and **FIGURE 10B**, shows top and side views of a weightlifting apparatus consistent with certain embodiments of the present invention.

## DESCRIPTION OF THE INVENTION

20        While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and will herein be described in detail specific embodiments, with the understanding that the present disclosure is to be considered as an example of the principles of the invention and not intended to limit the invention to the specific embodiments shown and described.

25        The present invention relates generally to the field of exercise equipment, and more particularly, in certain embodiments consistent with the invention, to a free weight device to facilitate certain types of exercise. Certain embodiments consistent with the present invention relate to a device for lifting weights for

development of the fingers, hands, wrists, arms, and shoulders. In several embodiments, the device allows the use of conventional off-the-shelf weights for the major portion of the weight, but other embodiments could use customized weights. Such embodiments may have a weight bar with weights added to one  
5 end of the bar. The opposite end of the bar can be used as a handle and for attachment of gripping plates used for wrist and finger strength development.

With traditional weight lifting tools the amount of weight cannot be easily and incrementally varied. Thus, in a karate studio using these tools, many weight sets may be needed. Moreover, there is currently no known commercially  
10 available no way that weights from standard weight lifting apparatus can be used. Variable space and money are therefore consumed in a facility that wishes to provide the ability to replicate these exercises to multiple patrons with differing weight needs and hand sizes simultaneously.

In accordance with certain embodiments consistent with the invention, off-  
15 the-shelf weights can be used in one integrated unit while preserving the essential structure of the traditional apparatus of Okinawa. In certain embodiments, a weight bar is provided for repetitious manipulation by a weightlifter. The bar can have an end cap and a clamp secured by the weightlifter for keeping the weights at one end of the bar. If desired, the person  
20 exercising can use a weighted bar in each hand. Opposite the end cap, at the handle, there is a pivotal or fixed mechanism for attachment of a gripping plate or gripping disk. The gripping plate can be used for exercises that develop the fingers, hands, and wrists.

In certain embodiments, the invention provides for use of multiple handle  
25 sizes to accommodate the needs of users with different hand sizes. Certain embodiments consistent with the present invention has an integrated one piece handle, however a larger unit with a detachable larger handle (i.e., a two piece handle) can also be provided. A sleeve can also be used to provide a larger

diameter handle. Elliptical, variable diameter or multi-diameter gripping disks can be provided in certain embodiments for accommodation of various hand sizes. The disks can be provided in various sizes to accommodate different hand sizes. The elliptical disks, variable diameter disks and the multi-diameter disks allow one disk to serve multiple hand sizes.

In one exemplary use, the weighted handle is hung by a pivoting attachment mechanism from the gripping disk. The user then lifts the weights by flexing the fingers and/or wrist upward to lift the weight by the gripping plate. Usually, but not necessarily, this is done using two such weight devices (one for each hand) and lifting with both hands simultaneously. The arms may also be lifted up to the horizontal position and the hand rotated about the wrist, thus developing the muscles of the top of the hand. Of course, other exercises may also be performed with devices consistent with the present invention.

In certain exemplary uses where the weight is integrated into the gripping disk and the disk is made of a firm, flexible material, the exercise device can be quite portable. Finger exercises can involve the finger muscles in a dynamic way, and the wrist can be flexed in the exercises. This allows the device to be easily adapted to all sorts of exercises. For example, in addition to training for the martial arts, hand development for pistol shooters and those in need of certain types of physical therapy of the hands can potentially benefit.

Referring now to **FIGURE 1**, a weightlifting apparatus 100 consistent with certain embodiments of the present invention is depicted in a side view. One or more standard commercially available barbell weights 104 (four shown) of the type having a central aperture for attachment to a barbell bar are threaded over a bar 108 from the top end. A flange or end cap 112 that is attached to or integrally formed with the bar 108 serves to stop the weights 104 from slipping off the lower end of the bar. The weights can be secured to the bar in place adjacent the end cap using any of a number of structures. In this illustrative

embodiment, the bar is passed through a removable collar 116 having a central aperture and the collar is locked into place to secure the bar. In this embodiment, the collar is secured using a set screw 120 (e.g., a hex head set screw driven with an Allen wrench), but other mechanisms for securing the collar are equivalent. The collar and set screw should be considered a type of clamp for purposes of this discussion. In other embodiments, the collar may be fixed and hold a specific amount of weight permanently to the bar, or the bar may be fabricated to incorporate a fixed amount of weight. Other mechanisms for securing the collar or otherwise securing the weights in place could be readily substituted without departing from the present invention. In this arrangement, the weights are suspended from the gripping plate to permit a user to perform exercises by lifting the weight using the hand and/or fingers holding the gripping plate.

Many commercially available weights are available with a central aperture that is dimensioned to allow passage of a one inch bar. Thus, in one embodiment, the bar can have an outer diameter 124 of approximately one inch to allow passage of such weights, but this should not be considered limiting. The bar 108 may have a textured area 128 imprinted in the bar or may otherwise be textured in a handle area adjacent the upper end as shown.

In order to utilize the apparatus 100 for certain hand, wrist, arm and finger exercises, a hole 132 is formed in the bar near the upper end thereof. The hole can be centered approximately one half inch from the top of the bar as shown by dimension 136. A gripping disk or gripping plate 140 having an aperture 144 therein can then be passed over the upper end of the bar 108 and pivotally secured in place by passing a pin such as a quick release pin 148 through a clip 152 attached to the upper surface of the gripping disk.

Thus, in an exemplary embodiment as described above, a weightlifting device consistent with certain embodiments of the invention has a weight bar 108

for repetitious manipulation by a weightlifter. The bar 108 has an end cap 112 and a collar 116 or clamp or other suitable equivalent mechanism to secure the weights 104 at one end of the bar 108. Opposite the end cap 112, at the other end of the bar that serves as a handle, there is a mechanism (in this case, pin 148, clip 152 and aperture 132 for pivotal attachment of gripping disks.

For purposes of this document, the terms "gripping disk" or "gripping plate" synonymously refer to any suitably shaped structure that can be used to carry out the exercises described herein, whether disk shaped, elliptical shaped, oval shaped, irregularly shaped, variable diameter shapes, multi-diameter shapes, hand or finger contour shaped, or any other suitable shape without limitation by the conventional meaning of the term "disk." The gripping plates or gripping disks are used for exercises that develop the fingers, hands, and wrists. Elliptical gripping plates, variable diameter and multi-diameter contour shaped gripping plates can be provided for accommodation of various hand sizes, or other shapes can be used. This embodiment integrates functions normally performed by several devices into a single device and can be realized in an embodiment that uses off-the-shelf weights to permit the user to vary the weight loading of the device without need to purchase special weights.

Thus, in accordance with certain embodiments consistent with the present invention, a weightlifting apparatus for use in conjunction with an exercise weight of the type that has a central aperture that permits the weight to be secured to various weightlifting appliances has a bar having a first and a second opposing end. A weight is secured weight adjacent the first end of the bar. A mechanism is provided adjacent the second end of the bar for pivotal attachment of a gripping plate.

Another illustrative example embodiment 200 is depicted in **FIGURE 2**. In this exemplary embodiment, like reference numerals represent similar or identical elements as described in conjunction with device 100. In this embodiment, bar



208 has an un-textured handle and the weights 104 are secured in place with a clamp mechanism 212 that has a hinge side 216 that has a hinge mechanism and a closure side 220 secured with a wing nut 228 as illustrated more clearly in **FIGURE 5**. The clamp has a pair of body portions 232 and 236 that are curved to mate with the bar 208. The clamp is wrapped around the bar 208 with a bolt 240 passing through aperture 244 on surface 246 and slot 248. The bolt is secured in place with wing nut 228 which is tightened to cause clamping pressure to be applied to the bar 208 and secure the clamp, and thus the weights 104, in place.

Referring back to **FIGURE 2**, the top end of bar 208 incorporates an eye 260 through which a hook 264 passes. Hook 264 is attached to a gripping disk 268, so that the weights can be pivotally suspended from the gripping disk. In device 100 and device 200 (as well as other embodiments), the length of bar 108 or 208 can be any desired length. In certain embodiments, a range from approximately twelve to twenty inches at dimension 272 may be suitable, but other lengths are also within the scope of the present invention.

Another exemplary embodiment is shown in **FIGURE 3**. This embodiment differs from **FIGURE 1** by having a gripping plate 304 that has an integrated sleeve 308 that is used to secure the gripping plate 304 to the shaft 312 by use of a pin 316 that passes through the sleeve 308 and the shaft 312 holding the weights 104. The clamping arrangement shown is similar to that of **FIGURE 2**, but any suitable clamping arrangement can be used. As illustrated, the hole 322 in shaft 312 can be offset from center if desired.

**FIGURE 4** depicts another exemplary embodiment similar to that of **FIGURE 1**. This embodiment differs in several respects. The gripping plate 340 is secured with a klik pin 344 that passes through a collar 348 in the gripping plate 340 and the shaft 358. After the pin 344 is inserted, a loop 362 of the klik pin 344 flips over the collar 348, thereby inhibiting the pin from slipping out. The

clamp in this embodiment is a split shaft collar 364 secured by a screw to cause the split shaft collar 364 to close and grip the shaft 358.

As previously mentioned, any number of shapes can be adapted for use as gripping plates. Circular gripping disks ranging in diameter from approximately four inches to approximately four inches to approximately six inches are suitable for most human hands. In order to reduce the number of gripping disks that might be needed by a commercial exercise facility (e.g., a gym or dojo), other gripping plate shapes can be used to handle more than one hand size per disk. One embodiment is depicted in **FIGURE 6** as an elliptical gripping plate 402 with central aperture 404. By using an ellipse shape, the user can find a comfortable size for his or her hand using either the longer dimension 406 or the shorter dimension 408. For certain embodiments, the long dimension can be either five or six inches and the shorter dimension 408 can be either 4 ½ inches or 5 ½ inches, but such dimensions should not be considered limiting and should only be viewed as approximate guidelines. Using such elliptical gripping plates, a set of two gripping plates will cover a wide range of hand sizes. Other sizes could also be used without departing from the invention. When used in conjunction with device 100, a clip 152 can be mounted at 412, but collars, sleeves or other mechanisms to facilitate attachment to a shaft can be devised without departing from the present invention.

**FIGURE 7** depicts a variable diameter gripping plate 500 that can be adapted to a wide variety of hand sizes. In this gripping plate configuration, the lines defining the outer periphery of the gripping plate 500 from 522 to 526 and from 528 to 522 define spiral segments. These spiral segments are offset from center to provide a variety of usable dimensions in a single gripping plate. In this gripping plate configuration, the variable diameter gripping plate and has first and second opposed offset spiral segments defining a portion of a periphery thereof with the perimeter of the gripping plate 500 varying between the three diameters

shown in dashed lines. These diameters in one embodiment (diameters 510, 512 and 514) can be approximately 5.15 inches, 5.62 inches and 6.10 inches from the center of aperture 518. In another embodiment, the diameters can be approximately 4.43 inches, 4.85 inches and 5.25 inches. Two such variable  
5 diameter disks with these dimensions can provide comfortable gripping for a wide range of hand sizes.

In this embodiment of a variable diameter gripping plate 500, the outer diameter drops abruptly at area 522 from diameter 514 to diameter 510 (traveling clockwise around the perimeter) and then gradually increases diameter until  
10 diameter 514 is reached around 160 degrees from area 522. At area 526, the outer diameter drops abruptly to approximately four inches and then curves outward to diameter 510 (still traveling clockwise). Once it reaches diameter 510, the curve gradually increases until it reaches diameter 514 at area 522. By providing a variable diameter around the periphery of gripping plate 500, different  
15 size hands can be more easily accommodated. This curve permits the user to find any number of areas of comfort to grip and adapts to a wide variety of hand sizes when using the weightlifting apparatus. The edge defined by the spiral segment between 528 and 522 is generally intended for the thumb, while the edge defined by the spiral segment between 522 and 526 is generally intended  
20 for the fingers. Of course, other grips could also be employed without departing from the invention. Many other irregular shapes, variable diameter shapes, or multi-diameter configurations could also be devised without departing from the present invention.

The gripping plate depicted in **FIGURE 7** also may have an area 530 for  
25 mounting clip 152 in this embodiment, but other embodiments can be adapted for use with other fixed or pivotal mounting arrangements for connection to bar 108, 208, 312 or 358. In such embodiments, collars, sleeves or other mounting arrangements can be readily provided. Other multi-diameter gripping plate

arrangements can also be devised consistent with certain embodiments of the present invention. The gripping plate 500 as depicted is a right hand gripping plate. A left hand gripping plate is similarly shaped with the clip mounted to the other side.

5           Thus, one exemplary exercise apparatus consistent with certain embodiments of the present invention has a gripping plate and a weight connected to the gripping plate so that a user can exercise the hand, fingers and arms by lifting the weight by the gripping plate. The weight may be suspended from the gripping plate in certain embodiment by any suitable suspension  
10           mechanism including, but not limited to the bar described above. The gripping plate may be any of the following shapes: disk shaped, elliptical shaped, oval shaped, irregularly shaped, variable diameter shaped, multi-diameter shaped, hand contour shaped and gripping contour shaped or any other suitable shape consistent with the intended uses described herein. The gripping plate may be  
15           made of a rigid, firm or flexible material. In certain embodiments, the gripping plate incorporates a cavity, and the user can selective place weights within the cavity, as will be described later.

          In certain embodiments, the gripping plate may be a variable diameter gripping plate in which the perimeter that varies in diameter between three  
20           diameters - a narrower diameter, an intermediate diameter and a wider diameter. In one embodiment, the outer diameter drops abruptly at a first point on the perimeter the wider diameter to the narrower diameter and then gradually increases diameter until the wider diameter is reached about 160 degrees from area first point; and wherein at a second point perimeter drops abruptly to  
25           beyond the narrower diameter then curves outward to the narrower diameter, and then reaches the narrower diameter at which point the perimeter gradually increases in diameter until it reaches the wider diameter at the first point. In certain embodiments, the narrower diameter, the intermediate diameter and the

wider diameter can be approximately 5.15 inches, 5.62 inches and 6.10 inches respectively from a central point. In another embodiment, the diameters can be approximately 4.43 inches, 4.85 inches and 5.25 inches. Other arrangements of offset opposed spirals or other irregular shapes can also be used to define the perimeter of a gripping plate consistent with certain embodiments of the present invention.

**FIGURE 8** depicts another embodiment 600 of the handle portion of an exercise device consistent with the present invention. In this embodiment, the handle is fabricated in two parts. The weight carrying part 604 has diameter 124 suitable for accepting weights and an end cap 124 at one end. The other end of part 604 has a threaded member 608 extending outward therefrom with the threaded member centered along the center axis of the weight carrying part. A handle part 612 may then have a mating female thread 616 in an end thereof that engages the threaded member 608, with a lock washer 620 therebetween, to form a complete handle. The diameter of the handle part 612 may be larger in diameter 624 (e.g., about 1.25 to 1.5 inches) to prevent weights from sliding toward the user's hands, but a clamp or collar or other mechanism is still suggested for use in firmly securing the weights against the end cap 112. The other end of the handle part 612 can be adapted for pivotal attachment of the gripping disks. In one embodiment, the two part handle mechanism 600 may have lengths of approximately eleven inches at dimension 630 and about nine inches at 634, but other lengths are also consistent with certain embodiments of the present invention.

When gripping disks are not being used for a particular exercise, it may be desirable to provide another handle to the bar handles such as 108. This permits the user to carry out hand, wrist, arm and shoulder exercises using the bar and weight without the gripping plate. In such cases, a sleeve handle such as handle 700 of **FIGURE 9** can be used if desired. In this embodiment, a sleeve

incorporates a central bore 704 running lengthwise that is appropriately dimensioned to receive the bar 108 to provide an area of larger diameter 708 that may be more comfortable for average to large sized hands (e.g., approximately 1.25 inches in diameter). The bar may be used directly as a handle for smaller hands or if otherwise desired. The handle sleeve may also be padded or have a textured outer surface and may be coated with foam, rubber, leather, plastic or other materials that may be desirable for providing an enhanced gripping surface. The sleeve may be held in place by alignment of an aperture 712 situated near one end with aperture 132 and insertion of a pin or a bolt or the like therethrough.

For the embodiments described above, the gripping plate may be made of any material that can support the weight used for carrying out the exercises. Such materials as metal, wood, plastics, etc. are all suitable. In other embodiments, the gripping plate may be used without the rod and barbell weights to carry out exercises. In one exemplary embodiment, shown in **FIGURE 10**, a variable diameter gripping plate may be shaped as shown similar to gripping plate 500. A central aperture 804 can be used to directly support a customized weight of any suitable configuration that attaches directly to the aperture. In this example, a weighted ball can be held in place by a friction fit. In another embodiment, the weight can be integrated into the gripping plate. In other embodiments, a compartment can be formed in or attached to the gripping plate into which the user can add selective amounts of weight as desired for a particular exercise. In the exemplary embodiment illustrated, the thickness tapers outward from diameter 816 and can be, for example 1.25 inches at 820 and 0.5 inches at 824. Cavity 804 may be, for example, three inches in diameter at diameter 816. Other dimensions may also be suitable for implementation of certain embodiments consistent with the present invention. In this case, the gripping plate may be made with any desired degree of firmness or flexibility in order to accommodate the hand, finger or arm exercises contemplated. In one

embodiment, the gripping plate may be made of a firm but flexible rubber material (or similar) so that the gripping plate may be used in exercises in which the gripping plate is flexed and/or squeezed to carry out various hand and finger exercises.

5           Thus, in accordance with certain embodiments consistent with the present invention, a weightlifting apparatus has a bar having a first and a second opposing end. A weight having a central aperture is dimensioned so that the bar can be passed through the aperture. The bar has an end cap having an outer dimension larger than that of the bar and the aperture, with the end cap being  
10           situated adjacent the first end of the bar. The bar passes through the central aperture and rests against the end cap. A clamp secures the weight to the bar adjacent the end cap. A gripping plate has a clip attached thereto for attachment to the bar. An aperture through the bar adjacent the second end of the bar is provided for pivotal attachment of the gripping plate using a pin passing  
15           through the clip. The gripping plate can be shaped in one of the following shapes: disk shaped, elliptical shaped, oval shaped, irregularly shaped, multi-diameter shaped, hand contour shaped and gripping contour shaped, for example, or any other suitable shape. A sleeve can slide over the bar to form a handle near the second end. The bar can be a one part bar or a two part bar  
20           with a weight carrying part and a handle part, connected together by a threaded engagement.

          Many variations will occur to those skilled in the art upon consideration of the present teachings. For example, the clamp can be replaced with any type of clamping or retaining mechanism that holds the weights in place. Instead of  
25           variable off the shelf weights, custom or fixed weights can be substituted. The handle can be made of metal or any other suitable material. Other pivotal attachments schemes or suspension attachment schemes can be devised and other variations can be devised without departing from the invention. In other

embodiments, the gripping plate can have any desired degree of flexibility or rigidity and may incorporate a compartment into which weights are added to vary the weight of the gripping plate. Other variations will occur to those skilled in the art upon consideration of the present teaching.

5           While the invention has been described in conjunction with specific embodiments, it is evident that many alternatives, modifications, permutations and variations will become apparent to those of ordinary skill in the art in light of the foregoing description. Accordingly, it is intended that the present invention embrace all such alternatives, modifications and variations.

10           What is claimed is: